

**INTERVIEW SUMMARY RECORD**

Applicant's discussed the rejections of the pending claims on February 22, 2006. A telephone conference occurred including Primary Examiner Ivars Cintins and Applicants' attorneys Stephen Shear, Reg. No. 25,764 and Michael Pritzkau, Reg. No. 37,913.

The interview addressed the rejected claims in view of the Gruden and Reed references, but no agreement was reached. The submission of an affidavit was discussed with respect to unexpected results that have been observed with respect to L type carbon. The Examiner expressed concern with respect to consideration of this affidavit with respect to the presence of an associated description in Applicants' specification and referred Applicants to *In re Herr*, 134, USPQ 176 (July 11, 1962) and *In re Davies*, 177 USPQ 381, April 5 (1973). The Examiner suggested that any appropriate case law, of which Applicants' become aware, should be brought to his attention. Applicants agreed and the interview was closed.

**REMARKS**

Claims 1-22, 24-26 and 28-35 remain pending. In this regard, it is noted that claim 26 has been allowed. The remaining claims have not been amended since Applicants believe that the claims overcome the art of record, as they stand. A supplemental IDS is being provided herewith, citing one reference that has recently come to Applicant's attention. Two additional references are also provided herewith that are labeled as Exhibit X and Exhibit Y. It is noted that both Exhibits X and Y are antedated by the filing date of the present application, but are provided for explanatory purposes as discussed in a Declaration, provided herewith, by Dr. Mark Hernandez. Applicants appreciate the Examiner's consideration of the Application.

**The § 103 Rejections**

The Examiner has made the rejections of claims 1-25 and 28-35 under 35 U.S.C. § 103(a) final as being unpatentable over a doctoral thesis entitled *FATE AND TOXICITY OF AIRCRAFT DEICING FLUID ADDITIVES THROUGH ANAEROBIC DIGESTION* by Cynthia Lee Gruden as directed by Dr. Mark Hernandez (hereinafter, Gruden I) in view of another publication entitled *METAL ADSORPTION BY ACTIVATED CARBON: EFFECT OF COMPLEXING LIGANDS, COMPETING ADSORBATES, IONIC STRENGTH, AND BACKGROUND ELECTROLYTE* by Reed, et al. (hereinafter Reed). Applicants respectfully traverse, as will be discussed below.

Applicants continue to believe that the arguments made in the response of August 24, 2006 are persuasive. Hence these arguments are incorporated herein by reference. Moreover, the references are considered to be ineffective at least for the reasons discussed below.

The rejection of independent claims 1, 28, 30, 33 and 34 relies on Gruden I with respect to the following passage, taken from page 123 of the reference and which is set forth immediately hereinafter for the Examiner's convenience:

Current novel digester configurations (USAB) have incorporated GAC as a support matrix to retain high biomass levels. Results from this research indicate that the addition of GAC to an anaerobic treatment system for ADF waste may diminish the toxic effects of MeBT and may eliminate MeBT from the effluent. This design may be fortuitous for other industrial waste streams because MeBT sorbs to GAC while simultaneously binding heavy metals; thus, adding MeBT to PACT or USAB may enable the treatment of waste streams with very high metals content that would otherwise be toxic.

Applicants believe that this passage is exclusively limited to the context of removing heavy metal in an anaerobic digester, as will be discussed below, sentence-by-sentence and referred to as the "Gruden passage."

The first sentence of the Gruden passage clearly states that the digester configurations that are under consideration have incorporated GAC as a support matrix for supporting a biomass. The purpose of the biomass, as part of a digester, is indeed to digest specific materials in a waste stream such as, for example, proteins. These materials may be referred to hereinafter as "digestible materials." There is no other purpose for the biomass. Further, it is indisputable that the digester is inoperable for its intended purpose without the biomass. The GAC was introduced for purposes of retaining a high biomass level. In other words, the initial purpose for the GAC was to avoid the flushing of the biomass out of the digester by the waste stream, thereby "retaining" the biomass.

The second sentence of the Gruden passage refers to result that indicate that the addition of the GAC to an anaerobic treatment system for ADF waste further may diminish the toxic effects of the MeBT. Of course, this result is obtained since the MeBT sorbs to the GAC. It should be appreciated, however, that the "toxic effects" that are mentioned are the toxicity of the MeBT with respect to the biomass. In other words, without the GAC, the MeBT can kill the biomass. Hence, the GAC protects the biomass from the MeBT. Of course, the reasonable conclusion that can be drawn from this is that the waste stream must contain digestible materials or there would be no need for the biomass, in the first instance, and certainly no need to protect the biomass from MeBT.

In sum, to this point, the MeBT, which may enter the digester as pollution, may be toxic to the biomass of the digester, in and by itself. Gruden appreciates that the MeBT sorbs to the GAC in a way which protects the biomass from the toxicity of the MeBT. That is, by the MeBT sorbing to the GAC, the biomass is isolated and protected from the MeBT.

The third sentence of the Gruden passage the goes on to say that "This design may be fortuitous for other industrial waste streams because MeBT sorbs to GAC while simultaneously binding heavy metals..." Initially, it is pointed out that "This design" clearly refers to a digester including GAC for supporting a biomass. The question with respect to this initial portion of the third sentence is what is meant by the term "other industrial waste streams." The latter portion of the third sentence provides appropriate clarification as to what is meant by "other industrial waste streams." Specifically, following a semicolon, the third sentence states:

[T]hus, adding MeBT to PACT or USAB may enable the treatment of waste streams with very high metals content that would otherwise be toxic. [emphasis supplied]

Clearly, the subject matter has not been broadened by sentence three when the portion of the sentence, which follows the semicolon, is specifically addressed to adding MeBT to a PACT or USAB digester and serves as the

conclusion of the sentence. What is being discussed with respect to "other industrial waste streams" is a waste stream that is suited for processing by a digester. The "treatment" that is discussed is specifically treatment in a digester. The subject is the effect of MeBT on the function of a digester and, according to the passage, even this suggested extension is not a certainty and "may enable" such an extension of digester treatment. Again, this digester has a biomass that is supported by GAC. The concern with respect to the metal, which is the identical concern with respect to adding the MeBT, is the potential toxicity of the metal to the biomass. That is, this discussion is directed to protecting the biomass from the metal, in the identical spirit that the biomass was protected from the MeBT by the GAC support matrix. The waste stream, therefore, must include digestible materials that are the target for the digestive function of the biomass. Moreover, there is no reason to assume that the introductory portion of sentence three, which precedes the semicolon, would be so broad as to contemplate a waste stream that is not intended for processing in a digester, when the concluding portion of the sentence is specifically directed to digesters. It is Applicant's position that the "other industrial waste streams" are clearly intended to be processed by a digester.

In view of the foregoing, it is clear that the pre-semicolon portion of sentence three of the Gruden passage is being mischaracterized and taken in isolation from the rest of the passage as having an all-encompassing scope, in order to apply to any industrial waste stream, as is described in the second paragraph on page 4 of the Final Office Action. In this regard, it should be appreciated that the Examiner has carefully selected only a portion of one sentence in making out the rejection. It is well-settled that it is impermissible to pick and choose only so much of a reference is required to make out a rejection to the exclusion of what the reference teaches as a whole. Here, that selection is so specific as to be limited to a portion of a sentence. It is only in the context of such a broad, but unreasonable interpretation that the requirement of an acidic pH in claims 1, 28, 30 and 34 can be met. Clearly, the rejection fails when the passage, or even the sentence, is taken as a whole, for what it fairly teaches.

With respect to the requirement for an acidic pH in claims 1, 28, 30, 33 and 34, the Examiner, has admitted that Gruden I discloses the claimed invention "with the exception of the pH." In Applicants view, however, the Gruden I passage clearly requires a waste stream that is suitable for treatment by an anaerobic digester. An anaerobic digester is a microbiological system which must run at neutral pH to operate properly. This waste stream can not be acidic or it will kill biomass, which provides the very functionality of the digester. When viewed in a reasonable light, Gruden I clearly requires a waste stream for treatment by an anaerobic digester and teaches directly away from the claimed invention, which is intended to treat acidic waste streams which are inorganic in nature. Further, any proposal to modify Gruden I, so as to introduce an acidic waste stream into an anaerobic digester, clearly results in a device that is inoperable for its intended purpose: digestion. Accordingly, for at least these reasons, allowance of claims 1, 28, 30, 33 and 34 and their dependents is respectfully requested.

With respect to any reliance on the Reed reference for purposes of curing the deficiency of Gruden I, with respect to failing to teach, disclose or reasonably suggest an acidic pH, it is respectfully submitted that Reed is clearly deficient at least for the reasons set forth in Applicants' response of August 24, 2006. In particular, Reed is specifically limited to the mechanism of electrostatic immobilization and even disclaims any understanding of other types of mechanisms. As discussed in Applicants prior response, Reed is directed to removal of metal contamination, specifically

testing cadmium and nickel over a range having a lower limit of pH 3. Reed includes a particular focus on electrostatic force (i.e., electrostatic immobilization) and is limited to compounds that are not amphipathic, nor heterocyclic. Further, Reed is considered to fall within the class of electrostatic immobilization prior art techniques. Applicants' technique does not use this mechanism as set forth, for example, by claim 1.

Reed discusses surface charge characteristics of activated carbons in water and presents an equation that includes an electrostatic component on page 1987. This mechanism is discussed on the same page, fourth paragraph. Electrostatic force is brought into play in the Scenario 1 discussion on page 1988 of Reed which discusses the electric double layer of activated carbon, that is considered by Applicants as an electrostatic characteristic. Page 1989 includes an extensive discussion of electrostatic force with respect to both Reed's Scenario 2 and Scenario 3. Applicants consider that there are other points in the Reed reference that clearly limit its application to the use of electrostatic immobilization and disclaims an understanding of other mechanisms, at least some of which are discussed in Applicants response of - August 24, 2006.

With respect to independent claims 1, 28, 30 and 33, it is important to understand that an amphipathic heterocyclic metal-coordinating compound is recited that is selected based, at least in part, on a charge distribution which maintains a charge neutrality of the amphipathic, heterocyclic, metal-coordinating compound at the specific acidic pH. Applicants continue to see no reasonable way in which to interpret Reed as reasonably teaching, disclosing or suggesting these limitations. In contrast, Applicants view Reed as teaching directly away from the technique that is set forth in these claims. For example, Applicants technique is premised upon maintaining charge neutrality of the recited amphipathic, heterocyclic, metal-coordinating compound. Accordingly, for at least these reasons, allowance of claims 1, 28, 30, and 33, and their dependent claims, is respectfully requested.

While independent claim 34 does not specifically recite that the amphipathic heterocyclic metal-coordinating compound is selected based, at least in part, on a charge distribution which maintains a charge neutrality of the amphipathic, heterocyclic, metal-coordinating compound at the specific acidic pH, it is respectfully submitted that, based on the discussions above, the combined limitations of claim 33 are not taught or suggested by the art of record, when viewed in any reasonable light.

With respect to claims 10 and 13, it is noted that Applicants have found the use of L-type carbon to be highly advantageous in providing for unexpected levels of metal removal in combination with the amphipathic, heterocyclic metal coordinating compound. In support of this finding, an affidavit, by Dr. Mark Hernandez, Associate Professor of Civil, Environmental and Architectural Engineering at the University of Colorado, Boulder and an inventor in the instant application, is being submitted herewith for consideration by the Examiner. It is noted that the testing that was performed utilized actual contaminated industrial waste byproduct solutions that were essentially taken as they were found and diluted with filtered, deionized water, from a printed circuit board manufacturer. More than double the amount of contaminant metal was removed with L-type carbon in combination with the amphipathic, heterocyclic metal coordinating compound, as compared to the amount of contaminant metal that was removed using H-type carbon in combination with the amphipathic, heterocyclic metal coordinating compound. These remarkable results were achieved even though relatively severe hardness factors (> 500 mg/L of Calcium and Magnesium) were present in the solution that

was decontaminated using the L-type carbon in combination with the amphipathic, heterocyclic metal coordinating compound, thereby further demonstrating enhanced selectivity for the contaminant metal. While claims 10 and 13 depend through claim 7, which requires a pH of less than approximately 2, it should be pointed out the study described in the declaration of Professor Hernandez, accompanying this response, was performed on actual industrial wastewater at approximately pH 3.6, which is certainly important from a commercial standpoint, since it is representative of common real world applications. The difference in pH is not believed to be of concern since L type carbon maintains an appropriate charge distribution at least down to approximately pH 2. Moreover, Applicants would be willing to provide a claim depending directly from claim 1 which requires the use of L-type carbon.

With respect to the Examiner's consideration of this affidavit and the case law which was brought to the attention of Applicants in the telephone interview of February 22, Applicants refer the Examiner to MPEP section 716 (f), which is considered to provide more relevant authority. In particular, citing *In re Chu*, 66 F.3d 292, 298-99, 36 USPQ2d 1089, 1094-95 (Fed. Cir. 1995) (hereinafter *Chu*), MPEP 716 (f) states:

The totality of the record must be considered when determining whether a claimed invention would have been obvious to one of ordinary skill in the art at the time the invention was made. Therefore, evidence and arguments directed to advantages not disclosed in the specification cannot be disregarded.

Moreover, *Chu* itself states:

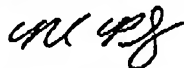
We have found no cases supporting the position that a patent applicant's evidence or arguments traversing a § 103 rejection must be contained within the specification. There is no logical support for such a proposition as well, given that obviousness is determined by the totality of the record including, in some instances most significantly, the evidence and arguments proffered during the give-and-take of *ex parte* patent prosecution.

Accordingly, it is respectfully submitted that consideration of the Rule 132 affidavit by the Examiner is appropriate at this juncture.

For the foregoing reasons, it is respectfully submitted that all of the Examiner's objections have been overcome and that the application is in condition for allowance. Hence, allowance of these claims and passage to issue of the application are solicited.

If the Examiner has any questions concerning this case, the Examiner is respectfully requested to contact Steve Shear at 520-825-8874.

Respectfully submitted,



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